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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/565,481

01/20/2006

Pierre Barberis

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26646 7590 04/19/2007  
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NEW YORK, NY 10004

EXAMINER

AWAI, ALEXANDRA F

ART UNIT

PAPER NUMBER

3663

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/19/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	Application No. 10/565,481	Applicant(s) BARBERIS ET AL.	
	Examiner Alexandra Awai	Art Unit 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 January 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 16-29 is/are pending in the application.
- 4a) Of the above claim(s) 1-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Status of the Claims*

1. New claims 16-29 have been examined, original claims 1-15 having been cancelled.

### *Drawings*

2. Figs. 1-3 and 5 are objected to because it is not clear that all details in what are apparently black and white photographs are of sufficient quality so that all details are reproducible in the printed patent (37 CFR 1.84(b)). With regard to Figs. 4 and 6, the copies available to Examiner appear to have labels that have not been translated from the French. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and

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informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 16-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over admissions by Applicant, and further in view of Andersson (5,876,524).

In setting forth the state of the prior art, and even in describing the instant invention, Applicant provides several admissions that characterize certain features of the claimed invention as conventional or known. These admissions from the specification include the following:

“The alloy classes known as “Zircaloy 2” and “Zircaloy 4” are the classes that are used for the most part” (p. 1, lines 15-17),

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“Other Zircaloy 2 type alloy classes can be used having higher contents of Fe and/or Cr and/or Ni, as can other alloys containing 0.5% to 2% Sn 0.5% to 2% Nb; and 0.1% to 1.2% Fe, or 0.5% to 2% Sn, 0.1% to 1% Fe, and 0.1% to 1.2% Cr, or 1.5% to 3.5% Nb and 0.5% to 2% Sn” (p.1, lines 28-32),

“After the usual operations for obtaining the starting sheet, including in particular  $\beta$  quenching when the sheet is at its final or almost final thickness, annealing heat treatment is performed after  $\beta$  quenching at a temperature in the range of 600°C to 800°C in a static oven or in the range of 700°C to 800°C in a continuous oven. After that, the operations of bending the sheet to fabricate the box are performed. In particular because of the specified content of volatile impurities and the conditions of the  $\beta$  quenching, an acicular (needle-shaped) structure is obtained of the so-called “basketweave” type (i.e., presenting a basket-like pattern) with care being taken during the subsequent heat treatment not to eliminate that structure” (p. 2, lines 25+),

“To implement the invention, the method begins by preparing a zirconium alloy flat product using conventional steps of melting an ingot, generally forging the ingot, hot rolling, where appropriate in a plurality of passes optionally separated by heat treatments, generally one or more cold rolling and annealing operations” (p. 7, lines 29-35), and

“They are thus better adapted specifically to fabrication by various forming method to produce parts for use in making up fuel assemblies for power station nuclear reactors ... A preferred application of the invention is making boxes for boiling water reactors. Grids and central tubes can also advantageously be obtained using flat products prepared by the method of the invention” (p. 18, lines 17-26).

The first two excerpts provide evidence that Applicant is not the inventor of the particular alloys set forth in claims 17-21, which are conventionally used to make parts for use in nuclear reactors. The third and fourth excerpts communicate that the steps of “preparing and casting a zirconium alloy ingot” (claims 16 and 25), “shaping the ingot” (claims 16 and 25), “subjecting the flat arrangement to a  $\beta$  quenching operation under conditions to obtain within the flat arrangement an acicular structure at an end of the  $\beta$  quenching” (claims 16 and 25) are taught by prior art (EP-A-0 835 330). The fourth excerpt also teaches that cold rolling is a conventional process. The fifth excerpt demonstrates the dearth of enabling guidance Applicant provides for forming fuel assembly elements (claim 26), boxes (claim 27), grids (claim 28) and central tubes (claim 29),

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which are conventional nuclear reactor components whose fabrication from sheet metal and the like are well known to those of skill in the art.

Given these admissions, as well as the description of the invention on page 6 of the specification it is clear that the step which Applicant regards as constituting a contribution over the prior art is performing a cold rolling operation directly between a  $\beta$  quenching operation and annealing treatment – i.e., explicitly excluding intermediate annealing. However, the teachings of Andersson show that Applicant is not the first to conceive of this ordering of the metalworking steps.

With regard to the practice of performing cold rolling operations immediately after  $\beta$  quenching, Andersson provides the following teachings:

“U.S. Pat. Nos. 4,450,016 and 4,450,020 describe heat treatment in the  $\beta$ -phase range by beta quenching the tube billet before the last two cold rolling steps followed by two subsequent cold rolling steps to a final cladding tube with an intermediate vacuum anneal in the  $\alpha$ -phase range” (col. 2, lines 21-25),

“U.S. Pat. No. 3,865,635 discloses a method where the beta-quenching is performed before the last cold rolling step in the manufacture of final cladding tubes to achieve improved creep strength throughout the thickness of such tube” (col. 2, lines 42-46), and in reference to the disclosed invention,

“The cold deformation after  $\beta$ -quenching at final dimension of structural tube parts for fuel skeletons, which are characterized by subjecting a minor portion of the finally rolled and quenched tubes to a more reduced outer diameter, can be performed by cold rolling or cold drawing with a reduction degree of 5-30%, preferably by cold drawing with a reduction degree of 7-17%.

The final vacuum annealing in the  $\alpha$ -phase range on the product after  $\beta$ -quenching in final dimension is performed at a temperature and time that brings about a produce with an annealing parameter value,  $A$ , in the range  $3.4 \times 10^{-16}$  to  $3.4 \times 10^{-13}$ , and preferably in the range of  $6.0 \times 10^{-15}$  and  $1.7 \times 10^{-13}$ ,” (col. 3, lines 58+).

In each of the patents cited by Andersson, the relevant sequence of metalworking steps does indeed include a  $\beta$  quenching operation prior to cold working without intermediate annealing.  $\beta$

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quenching in the method taught by Andersson meets the limitation of claim 24 (col. 3, lines 48-57), which may already be an inherent characteristic of the known process for producing an acicular structure. In certain embodiments of the invention, the final annealing is carried out in the  $\alpha$ -phase at 500°C or 700°C for 5 hours (col. 4, lines 60+), which is relevant to claims 16 and 25. The reduction percentage range taught by Andersson clearly overlaps with the claimed ranges (claims 16, 22, 23 and 25) so discloses the reduction features with sufficient specificity given the nature of the relevant art. That is, cold rolling with any particular below-recrystallization temperature and intended degree of reduction is a matter of optimization within prior art conditions or through routine experimentation (MPEP § 2144.05.II). The skilled artisan is fully capable of arriving at the claimed ranges using known cold rolling technology by optimally balancing the need for appropriate reduction and the stress caused by performing this operation.

It would have been obvious to one of ordinary skill at the time of invention to modify the method of forming a flat zirconium alloy product disclosed as old in the cited admissions by Applicant by introducing the advantageous sequencing of  $\beta$  quenching-cold rolling-annealing with accompanying temperature and time parameters as disclosed by Andersson. The motivation to make this modification would be to achieve the stated benefits of lower irradiation induced growth, higher strength and corrosion resistance that, according to Andersson, result from performing the method that includes the aforementioned advantageous sequence of steps (col. 3, lines 11-22). Although the Andersson explicitly teaches the method as applied to cladding and construction tubes formed from billets, the operations and parameters involved are fully applicable to flat products, as is well known in the art. Additionally, it would have been obvious

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to practice the hypothetical obvious method taught and motivated by Applicant's admissions and the teachings of Andersson using the alloys previously established as old in order to make known nuclear reactor components by various conventional forming methods.

### *Conclusion*

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexandra Awai whose telephone number is (571) 272-3079.

The examiner can normally be reached on 9:30-6:00 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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AA  
April 16, 2007

  
JACK KEITH  
SUPERVISORY PATENT EXAMINER